DOCUMENT RESUME

ED 341 452 PS 019 830

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TITLE Predicting Specific Kindergarten Literacy Skills from Three-Year Olds' Preschool Experiences.
SPONS AGENCY Ford Foundation, New York, N.Y.; Spencer Foundation, Chicago, Ill.
PUB DATE 20 Apr 91
NOTE 19p.; Paper presented at the Biennial Meeting of the Society for Research in Child Development (Seattle, WA, April 18-20, 1991).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Family Role; *Language Acquisition; *Language Skills; *Literacy; Prereading Experience; *Preschool Children; Preschool Education; *Teacher Role

ABSTRACT

A study examined the association between specific features of the preschool language context and the development of children's literacy-related language skills. Teachers were interviewed about the frequency with which they read to student groups during the school day; their preferences about literature; and the nature of their curriculum. Teachers were also observed in the class, and spontaneous talk by target children was recorded. From the observations, five hypotheses were formed: (1) the amount of time spent in different preschool activities would relate to performance on kindergarten measures of language and literacy development; (2) the amount of time spent in extended talk with adults would correlate positively with children's language and literacy development; (3) the content of children's talk would relate to language and literacy outcome measures; (4) teachers' pedagogical attitudes would help predict children's language and literacy development; and (5) variables such as financial status, availability of a network of family and friends, and access to child care would be related to literacy outcomes. Findings revealed that multiple sources nurtured literacy; both homes and preschools made important contributions to literacy development; and skills such as those involved in language analysis, vocabulary development, and print knowledge develop in tandem to lead to literacy. (SAK)

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ED341452

Predicting Specific Kindergarten Literacy Skills From Three-Year-Olds' Preschool Experiences

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Paper Delivered at biennial meeting of the Society for Research in Child Development, Seattle, Washington, April 20, 1991. Support for this research was provided by the Ford Foundation and the Spencer Foundation.

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Our study can be situated with respect to two distinct bodies of research. In the previous paper by Beals, DeTemple, Tabors and Snow, Diane Beals outlined the way we locate ourselves relative to work on literacy development -- the primary focus of this work -- but our analyses can also be seen as illuminating the contribution of center-based preschool experiences to the development of language and literacy abilities.

Research done on university-affiliated Head Start programs has shown that such programs have short-term effects on measures of intellectual and academic growth and long-term effects on broader aspects of children's socio-emotional functioning that translate into success coping with the demands of schooling. In addition, two recent studies (Lee, Brooks-Gunn, Schnur & Liaw, 1990; Burchinal, Lee & Ramey, 1989) have found that community-based preschools also have significant beneficial effects on verbal achievement (Burchinal et. al.) and I.Q. While this research on the effects of preschool has contributed much to our understanding of the impact of early educational opportunities on children's development, it provides little detailed information about linkages between particular classroom experiences and the emergence of early language and literacy skills.

There are, however, several studies that describe the nature of children's language experiences in preschool (Dickinson, 1991a; Tizard & Hughes, 1985). This work, which has focused on the interactions between teachers and children, paints a fairly bleak picture of the extent to which adults and children are likely to engage in extended discussions during which children are encouraged to communicate novel or complex information (Dickinson, 1991a; Tizard & Hughes, 1985). Nevertheless, research from preschools and work done in homes suggests that there are settings in preschools which may facilitate language development: (1) during group times when books are read and discussed and children hear instructionally-related talk, and (2) times when adults are stationary and children are free to interact with them (i.e., during small group times; at meals when teachers are present).

Our goal was to examine the associations between specific features of the preschool classroom context and the development of literacy-related language skills. The data on the effects of preschool, together with research describing the language experiences of children in preschool, led us to anticipate that classrooms that enable children to engage in extended conversations with adults and children, and to have varied opportunities to use and interpret print, would tend to foster language and literacy development. Thus, we predicted that children who attended preschools where extended conversation and varied interactions with print were more common would perform better on measures of literacy development at age five. We now turn to discussion of the data that we collected.

Data Collection

The goal of the school visits was to capture as much information as possible about

each of our target children's typical preschool language and literacy experiences in a single visit.

Teacher interviews dealt with (a) the typical classroom schedule including the frequency of reading to large and small groups; (b) teachers' preferences regarding children's literature; and (c) questions probing the nature of the curriculum. We used this information as an indication of the teacher's general pedagogical orientation. These interviews were supplemented with **curriculum observation** checklists that rated features of the classroom (i.e., how it was organized, materials present) and provided information about the implementation of the curriculum. We constructed composite variables from the interviews and curriculum observation checklists by combining items that were theoretically related and that principal components analysis showed to covary to a notable degree. This process resulted in the creation of four composite measures of teachers' pedagogical orientations (see Table 1).

The second major type of data we collected were audiotapes of the **spontaneous talk** of our target children recorded by means of small tape recorders carried in back packs. Observers made field notes about the ongoing classroom activities to facilitate subsequent analysis of these tapes. About two hours of activity were recorded in each classroom, including full and small group times, free time, and a meal time. The contents of the tapes were coded for three types of information: the type of the activity (small group, full group), the child's conversational partner, and the topic of conversation.

As shown in Table 2, almost half of the time during which we recorded interactions our target children were engaged in free play. Some of the most common free play activities included building with blocks, doing puzzles, and "playing house." Next most frequent were full group activities. Typical "circle" times included singing (traditional songs including the "ABC"s), attending to the calendar and the weather, and book reading. The time children spent in small groups included math and pre-literacy activities, art projects, and book reading. Seatwork, which was focused primarily on completion of worksheets, comprised little of the overall time in school.

We also coded the audiotapes for the content of the talk, using the ten categories described in Table 3. All interactions that continued for five seconds or more were coded using one of those ten categories. The duration (in seconds) of each interaction was determined and all interactions of the same type were tallied. By this means we determined the average amount of time children engaged in each type of talk.

As shown in Table 4, the predominant category was "non-language." Activities that were not accompanied by any sustained language interactions comprised nearly half of the recorded time on average. The most common types of talk were skill routines and didactic (or instructional) interactions. Non-present and pretending talk together comprised about 13% of all talk. Notably low was the amount of time spent in conceptually focused talk.

To summarize, we were interested in characterizing preschool language and literacy environments by: (1) describing teachers' pedagogical attitudes (from our interview and curriculum observations), and (2) recording children's talk throughout the morning. We anticipated that the overall preschool language and literacy environment would affect children's emerging competencies. We also assumed that home influences would be reflected in how children engaged others in the classrooms and would have an impact on their emerging abilities. We were interested in determining whether, at the age of five, we could determine differential contributions from any of these early experiences on children's emerging literacy abilities.

Hypotheses

We formulated five hypotheses concerning the relationships we thought we might find between children's preschool experiences and their language and literacy development. Our **first hypothesis** was that the amount of time spent in different kinds of preschool activities (e.g., book reading, small group activities) would be related to performance on kindergarten measures of language and literacy development.

Second, given the research demonstrating that the quality of interactions between caretakers (mothers predominantly) and children is related to the rate of development, we assumed that children would benefit from having many opportunities to talk with adults. Also (though there is little evidence of beneficial effects of interaction with peers on language development), we assumed that it is better for children to engage in talk with peers than to play alone. Therefore, our **second hypothesis** was that the amount of time spent in extended talk with adults and other children would be positively associated with children's language and literacy development.

Third, following the practice view of literacy development (Scribner & Cole, 1982), we anticipated that participation in genres in which language is used to create other worlds -- for example, narratives and fantasy talk -- would facilitate the emergence of literacy-related language skills. Thus, a **third hypothesis** was that the content of children's talk would relate to language and literacy outcome measures, with increased use of "world-creating" language being beneficial to development.

Fourth, we expected that the inclination of teachers to engage children in interactions that support language and literacy development would be related to their pedagogical beliefs. For example, teachers who value fostering language or early literacy development should be more likely to provide activities that foster the emergence of literacy-related language skills, and to engage children in the kinds of interactions that support the emergence of language and literacy abilities. Therefore, our **fourth hypothesis** was that teachers' pedagogical attitudes should help predict children's language and literacy development.

Finally, previous efforts to trace the effects of preschool experience on subsequent development have lacked detailed information about the families. We assumed that, even though all our families had limited incomes, there still would be considerable variability in the circumstances of the home, and that this variability would be associated with children's language and literacy development. Thus, our **fifth hypothesis** was that variables such as financial status, availability of a network of family and friends, and access to child care would be related to literacy outcomes. Controlling for these factors should then lend power to our efforts to detect associations between early preschool features and kindergarten-age assessments of literacy skills.

Results and Discussion

Our analyses were guided by two questions. First, do specific features of preschool classroom experience help explain the acquisition of literacy-related language skills? If so, which features of experience most strongly predict which particular skills? Four sub-domains of literacy skill were assessed for each child in kindergarten. These sub-domains were language analysis skills, print skills, extended text comprehension skills, and extended text production skills. For each of these literacy skills, we constructed three regression models. The first was a "baseline control model," which included four variables: (a) the number of hours per week spent in preschool; (b) gender of the child; (c) racial group of the child; and (d) a composite home variable that captured information about amount of social support, caregiving load, and financial constraints experienced in the target child's family. These variables were not the primary focus of our analyses; instead, by being potentially related to literacy achievement, they added power to our efforts to detect associations between features of early preschool experience and the kindergarten assessments of literacy skill. This additional power to detect what we believed would be rather subtle effects was particularly critical in light of the fact that we conducted these analyses on a preliminary sub-sample of only 24 children.

The second regression model for each outcome measure added the set of variables describing the teacher's pedagogical orientation to the baseline control model, allowing us to evaluate the extent to which a given pedagogical orientation translated into better (or worse) acquisition of literacy skills by the children. The third regression model included the control variables plus the cluster of variables describing the proportions of time during the audiotaped sessions that the children engaged in different kinds of language interactions. The addition of the talk type variables to the baseline control model enabled us to evaluate associations between the children's patterns of interaction in the classroom and performance on the outcome measures.[1]

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[1] In both of these cases, our strategy was to examine the increment to R^2 gained by adding each set of variables simultaneously to the set of control variables in the "baseline control model." This increment was evaluated in the context of the number of variables

In Figure 1 we display the results of this set of regression analyses. There are several noteworthy results. First, the control variables were strong predictors of two components of our kindergarten literacy profile: language analysis skill (R^2=36%, F=5.9, p=.009) and extended text comprehension skills (R^2=28%, F=2.5, p=.08). Second, the teacher's pedagogical orientation was associated with children's acquisition of print skills and narrative skills[2]. Third, the distribution of the target children's involvement in different interactions and kinds of talk was a strong predictor of all but language analysis skill.[3]

Before turning to a closer examination of the four sub-domains of literacy skill that we assessed, we would like to provide a framework for thinking about the abilities being developed. As shown in Figure 2, the tasks we administered to the children can be categorized along two dimensions: (a) whether or not the use or understanding of **extended discourse** is central to the task; and (b) whether or not conversational partners are likely to have a clearly **didactic goal** in mind when engaging in interactions that support the development of the skill. Our tasks, and the abilities that we feel they tap, fit into this matrix in the following fashion:

- **Language analysis** (word definition task) - requires control of extended text forms and is likely to be fostered by intentionally didactic interactions;
- **Story understanding** (Snowy Day book reading) - requires extended discourse skills but may be nurtured without as much of an intentional instructional effort;
- **Narrative production** (Bear Story task) - also requires use of extended text and may not require intentional didactic efforts to develop;
- **Print knowledge** (all the tasks on the ECDI battery) - does not require extended discourse skill but likely results from interactions with a didactic goal;
- **Vocabulary acquisition** (PPVT) - is demonstrated and might be acquired thorough attending to only small chunks of text (i.e., may not include significant challenges to a child's discourse-level skills).

With this framework in mind, we now turn to a discussion of specific findings for each sub-domain of literacy skill.

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added and total degrees of freedom.

[2] For print skills (CAP), the increment to R^2 gained by adding the set of teacher interview variables to the baseline control model was 29 percentage points (F=3.2, p<.10). For narrative skills (bear story task), the increment was 45 percentage points (F=4.2, p<.05).

[3] For print skills, the increment to R^2 gained by adding the child activity and talk type codes was 17 percentage points (F=2.4, p<.10). For reading comprehension, this increment was 21 percentage points (F=3.7, p<.05). For the PPVT, it was 47 percentage points (F=5.7, p<.01), and for narrative skills, the gain in R^2 was 19 percentage points (F=2.4, p<.10).

Language analysis. Performance on the word definitions task is strongly associated with home factors, as evidenced by the fact that the control model accounted for 36% of the variation on the measure ($p < .01$) and the fact that no school variables notably increased the explanatory power of the model (see Table 5). However, it is important to note that the control model included information about the number of hours spent in preschool school, and that this variable was strongly related to performance on the language analysis measure ($p = .07$). We included hours spent at preschool as a "home circumstance" variable because we assumed that the additional child care support provided by the preschools would alleviate the overall constraints experienced by the caregivers. However, this variable also captures information about the impact of schooling. Our inability to detect the particular feature(s) of schooling related to the development of language analysis skill does not necessarily imply that school experiences were not at least partially responsible for the children's ability to produce formal definitions.

Language comprehension. Story understanding (see Table 5), similar to language analysis, was related to home factors ($p < .10$), accounting for 27% of the variance. Unlike language analysis, though, two preschool variables explained notable amounts of variation in this sub-domain of literacy skill. These variables were the child's conversational partners during the audiotaped classroom activity (increment to $R^2 = .20$, $p < .05$) and the pedagogical orientation of the teacher (increment to $R^2 = .11$, $p = .10$). The most beneficial type of conversational experience seemed to be a balanced mix of time spent with adults, children and alone. Interestingly, the pedagogical stance associated with better performance on the book reading task was that which we labeled "skills orientation." It may be that teachers who are concerned with fostering early literacy skills are more aggressive about engaging children in discussions about books, which serves to develop comprehension skills.

Narrative production. As shown in Table 6, teacher support appears to be important to development of narrative production abilities, with the pedagogical orientation of the teacher notably increasing the explanatory power of the control model (increment to $R^2 = 45$, $p < .05$). Teacher attitudes reflecting a valuing of books and fostering of language development showed the strongest positive relationship to narrative production (related at $p = .01$). The identities of children's conversational partners were also important, accounting for 19 additional percentage points of explained variation above and beyond the control model ($p < .10$). As was the case with story comprehension, no single type of conversational partner is important; rather, a balance between time with children and time with adults appears to be most beneficial.

Vocabulary development. The pattern of results for vocabulary development (Table 7) was quite different from that for the tasks requiring use of extended discourse (i.e., language analysis, story understanding, and narrative production; please see Figure 2), in that the amount of time spent talking with other children was strongly correlated with performance on the PPVT ($p = .006$). This variable had not contributed to our understanding of the variation in children's performances for the three tasks discussed

earlier. Overall, the identity of the children's conversational partners added considerably to the control model's prediction of vocabulary knowledge (increment to R^2 = .47, p < .0001). Similarly, a variable closely related to amount of time spent interacting with other children, the percentage of time spent in pretend talk, was also strongly related to vocabulary development (p < .01).

Print knowledge. Several different preschool classroom variables provided information pertinent to predicting the children's print knowledge when they were in kindergarten (see Table 8). First, similar to the vocabulary measure, the amount of time spent interacting with other children and the amount of time engaged in pretend talk were both good predictors of print knowledge (the increment to R^2 over the control model was .16 in both cases[4]). However, these associations were not as strong for print knowledge as for vocabulary. Second, the teacher's pedagogical orientation was also a useful predictor of print knowledge (increment to R^2 = .29, p < .10), with a "skills orientation" being positively associated with print skills (p = .07) and the "laissez-faire orientation" being negatively related (p = .04).

Discussion

Our results give clear indication that preschool experiences contribute in important ways to children's early literacy development. After controlling for a variety of home factors, we were able to use measures of preschool experiences (derived from just a single visit and interview) to predict language and literacy development two years later. This is especially noteworthy because our present analyses were based on a relatively small sub-sample of 24 children.

Peer interaction and supportive adults both appear to facilitate the acquisition of literacy skills, but these contributions function differentially. Abilities that require the use of extended text and that we hypothesized would benefit from intentional didactic exchanges appear to be fostered by particular kinds of adult support. Teacher attitudes provide important support for narrative production and story understanding -- abilities involving extended discourse which can be nurtured without an explicit didactic agenda -- and for early print knowledge. However, these skills are not supported by adult input alone. A balance between opportunities to interact with peers and adults may be best for the development of extended text skills, while opportunities to engage in pretending with other children seem to support the acquisition of print skills.

It also appears that peer interaction is a valuable way to support vocabulary development -- an aspect of language that is less dependent upon comprehension of

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[4] This corresponded to p-values of .10 for conversational partners and .05 for percent of time spent pretending.

extended text and which can occur without conscious didactic (adult) efforts. Interaction with peers also contributes to development of print skills, perhaps by giving children opportunities to practice using these skills as they play.

Now, turning back to some of the larger issues related to literacy development that were raised in the paper delivered by Beals (Beals et. al., 1991), we can summarize our findings by noting that:

1) Literacy does appear to be a multi-faceted phenomenon which is nurtured by multiple sources. Adult and child input of varying types contributes in differential fashion to the emergence of literacy-related language skills.

2) Both homes and preschools make important contributions to children's developing abilities.

3) Although there appear to be differential pathways of support connecting early experiences to kindergarten abilities, it is also the case that there are reasonably strong correlations among these abilities. A number of skills -- most notably story understanding, language analysis, vocabulary, print knowledge -- develop in tandem. We think of these skills as constituting a literacy package. This set of abilities may seem to emerge in concert either because settings that provide experiences supporting one kind of ability also provide other experiences which support additional skills, or because certain pivotal experiences (e.g., extensive dinner table talk, lots of book reading) that support a multitude of abilities are occurring at the same time in the child's life.

In closing, it is important to bear in mind that these analyses are based on about half of our data set and that additional analysis of even this portion of the data is on-going. Considerable additional work remains to be done.

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FIGURE 1.

Percentage of Variation in Outcome Measures Explained By Home and School Measures

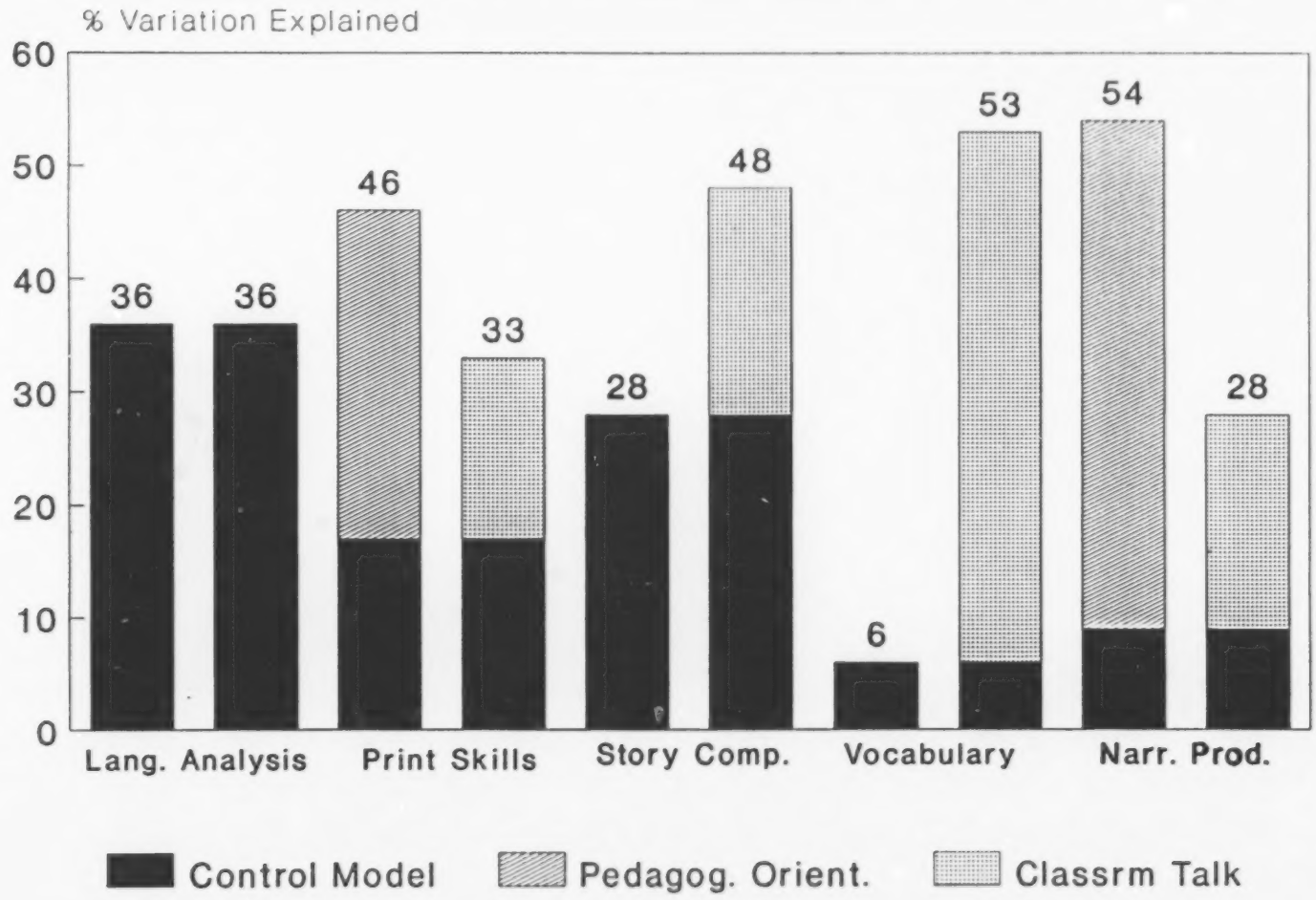

FIGURE 2.

CONDITIONS LIKELY TO SUPPORT ACQUISITION & NATURE OF TEXT REQUIRED FOR PROFICIENT PERFORMANCE

INTENTIONAL INSTRUCTIONAL EFFORTS LIKELY?	EXTENDED TEXT REQUIRED? YES	EXTENDED TEXT REQUIRED? NO
YES	**LANGUAGE ANALYSIS** (Formal Def.)	**PRINT KNOWLEDGE** (CAP)
NO	**STORY UNDERSTD'G** (Snowy Day) **NARRATIVE PROD.** (Bear Story)	**VOCABULARY** (PPVT)

Table 1. Teacher Pedagogical Orientations Expressed Through Interviews and Identified Using Principal Components Analysis.

Literacy Curriculum: Teacher attitudes reflect a broad literacy orientation and curriculum observation scores indicate rich content and a strong writing program.

Language and Literacy: Teacher's attitudes reflect a broad literacy orientation, concern for fostering children's language and cognitive development, and special literary sensitivity.

Readiness Skills: Attitudes reflect desire to develop school readiness skills and amount of time with children doing assigned work.

Laissez-Faire: Teachers provide large amounts of free time and place a high value on socio-emotional growth.

Table 2. Mean Percentage of Time Children Spent in Interactions with Different Conversational Partners and in Different Types of Activities.

Interlocutor	% of Recorded Time
Alone	47.5
Teacher	41.5
Children	10.9

Activity	% Year 1	% Year 2
Free Play	46.5	47.8
Small Group	16.2	13.0
Large Group	22.9	28.7
Seatwork	6.3	3.3
Meal Time	8.1	7.2

Table 3. Talk types and amount of talk engaged in each type of talk (average across sample)

Non-Language (46.7%) -- used to code extended periods of silence, gross motor activity unaccompanied by talk, and bursts of talk accompanying interactions lasting less than 5 seconds.

Didactic (9.7%) -- talk that is primarily aimed at imparting information; it includes instructions, procedures, and simple explanations regarding behavior (e.g. "don't hit him with that because it will hurt him").

Skill Routines (9.2%) -- language routines familiar to all participants; includes naming and labeling, reciting numbers and letters, and singing.

Print Skills (2.9%) -- print-associated talk, including decoding, pre-reading activities, and spelling practice.

Pretending (6.3%) -- fantasy-oriented talk, usually initiated, negotiated, and enacted by and between children.

Non-present (6.6%) -- talk about the past including personal narratives and story retellings, or talk about the future including planning and plan attempts.

Conceptual Focus (1.4%) -- talk that indicates broader requirements for understanding, including talk about language, world knowledge, and co-construction of ongoing events.

Book Reading (4.9%) -- talk about books as well as the actual reading of a book.

Engaged Talk (8.6%) -- talk that is not captured by any other category; includes general conversation and elements of child culture (e.g., talk about the backpack, toys from home, etc.).

Control Talk (3.7%) -- managerial talk in which behavior is the primary target.

Table 4.

CONTRIBUTION OF CLASSROOM VARIABLES AT AGE 3 TO PREDICTION OF LANGUAGE ANALYSIS AT AGE 5

(Formal Definitions Task)

	Model R^2	Incr. to R^2 over Control
Control Model	.36***	
Activity Types	.48	.12
Conver. Partners	.37	.01
% Time Pretend'g	.40	.04
Pedagogical Orient.	.39	.03

Significance is associated with the increment to R^2 over Control Model:

* p < .10 *** p < .01

** p < .05 **** p < .001

Table 5.

CONTRIBUTION OF CLASSROOM VARIABLES AT AGE 3 TO PREDICTION OF STORY COMPREHENSION ABILITY AT AGE 5

(Snowy Day task)

	Model R^2	Increment to R^2 Over Control Model
Control Mode	.27*	
Activity Types	.30	.03
Conver. Partners	.47	.20*
% Time Pretending	.38	.11
Pedagogical Orient.	.38	.11*

Table 6.

CONTRIBUTION OF CLASSROOM VARIABLES AT AGE 3 TO PREDICTION OF NARRATIVE PRODUCTION AT AGE 5
(Bear Story, Inclusion of Literate Features)

	Model R^2	Incr. over Control Model
Control Model	.09	
Activity Types	.25	.16
Conver. Partners	.28	.19*
% Time Pretend'g	.09	0
Pedagogical Orient.	.54	.45**

Significance is associated with the increment to R^2 over Control Model:

* p < .10 *** p < .01
** p < .05 **** p < .001

Table 7.

CONTRIBUTION OF CLASSROOM VARIABLES AT AGE 3 TO PREDICTION OF VOCABULARY KNOWLEDGE AT AGE 5

(PPVT)

Vocabulary

	Control Model R^2	Incr. to Control Model
Control Model	.06	
Activity Types	.30	.24
Conver. Partners	.53	.47****
% Time Pretending	.38	.32***
Pedagogical Orient.	.18	.12

Significance is associated with the increment to R^2 over Control Model:

* p < .10 *** p < .01
** p < .05 **** p < .001

Table 8.

CONTRIBUTION OF CLASSROOM VARIABLES AT AGE 3 TO PREDICTION OF PRINT KNOWLEDGE AT AGE 5

(Comprehensive Assessment Profile)

	Model R^2	Incr. over Control Model
Control Model	.17	
Activity Types	.37	.20
Conver. Partners	.33	.16*
% Time Pretend'g	.33	.16**
Pedagogical Orient.	.46	.29*

Significance is associated with the increment to R^2 over Control Model:

* $p < .10$ *** $p < .01$

** $p < .05$ **** $p < .001$